

Abstract of the Disclosure

In a method for forming a bonded semiconductor-on-insulator substrate for the fabrication of semiconductor devices and integrated circuits, a surface of a wafer of a monocrystalline semiconductor material is implanted with ions of the semiconductor material to a selected depth in the wafer to form, adjacent to the surface, an amorphous layer of the semiconductor material. The layer of amorphous semiconductor material extends to a substantially planar zone disposed at substantially the selected depth and comprising the monocrystalline semiconductor material damaged by lattice defects, i.e., end-of-range implant damage. Undamaged material below the selected depth comprises a first layer of the monocrystalline semiconductor material. The wafer is heated under conditions effective to convert the amorphous layer to a second layer of the monocrystalline semiconductor material and to coalesce the zone of damaged monocrystalline semiconductor material, thereby forming a substantially planar intrinsic gettering zone of substantially pure semiconductor material that includes active gettering sites disposed at substantially the selected depth. An insulating bond layer on one surface of a handle wafer is bonded to the surface of the wafer to form a bonded semiconductor-on-insulator substrate comprising a handle wafer, an insulating bond layer, and a device wafer of monocrystalline semiconductor material. The device wafer includes a substantially planar intrinsic gettering zone comprising substantially pure semiconductor material and including active gettering sites. The described bonded substrate is employed in the fabrication of semiconductor devices and integrated circuits.

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